



- 1. An assay for detecting an effect a compound has on a membrane receptor/reporter fusion protein, comprising the steps of:
- a) adding the compound to a cell comprising said membrane receptor/reporter fusion protein; and
- b) detecting any change of said receptor/reporter fusion protein.
- 2. The assay according to claim 1 wherein said assay is used to screen compounds for their effect on membrane receptors.
- 3. The assay according to claim 2 for screening compounds which modulate the activity of wild type and/or mutant membrane receptors.
- 4. The assay according to claim 3 wherein the membrane receptor is a wild type receptor and any change is detected as a decrease in activity of the receptor/reporter fusion protein.
- 5. The assay according to claim 3 wherein the membrane receptor is a constitutively active mutant receptor and any change is detected as an increase in activity of the receptor/reporter fusion protein.

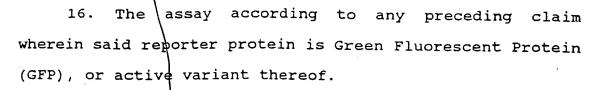
- 6. The assay according to any preceding claim wherein said assay is used to identify compounds that disrupt normal membrane receptor interactions, or can in themselves disrupt such interactions.
 - 7. The assay according to any preceding claim for detecting a compound which serves as an inverse agonist, antagonist or agonist of the membrane receptor.
 - 8. The assay according to claim 7 wherein said inverse agonist, antagonist or agonist of the membrane receptor is used in the study of receptor function or therapy.
- 9. The assay according to any preceding claim wherein said membrane receptor is a growth factor receptor, cytokine receptor, ion channel, integrin, or G-protein receptor.
 - 10. The assay according to claim 9 wherein said membrane receptor is a subtype, mutant, homolog, or chimeric form of a wild-type receptor.
- 11. The assay according to claim 10 wherein said mutant is a constitutively active mutant.

12. The assay according to claim 11 wherein the constitutively active mutant receptor/reporter fusion protein is initially unstable, such that the reporter activity is detected at a basal level and wherein after binding of a compound to the receptor/reporter fusion protein is stabilised and an increase in reporter activity is observed.

13. The assay according to any one of claims 9-12 wherein said G-protein coupled receptor is a dopamine receptor, a muscarinic cholinergic receptor, an α -adrenergic receptor, a β -adrenergic receptor, an opiate receptor, an cannabinoid receptor, a serotonin receptor or a protease activated receptor.

- 14. The assay according to any preceding claim wherein the receptor/reporter fusion protein is expressed from a nucleic acid construct comprising a gene encoding said reporter protein which is fused in-frame to the 5' or 3' end of a gene encoding said membrane receptor.
- 15. The assay according to any preceding claim wherein the functionality of said membrane receptor/reporter fusion protein is substantially unaffected by fusion of the reporter protein to the receptor.





- 17. The assay according to claim 16 wherein light emitted by said GFP protein is detected by fluoumetry, FACS, or microscopy techniques.
- 18. The assay according to any one of claims 1-15 wherein said reporter protein is Renilla reniformis (sea pansy) luciferase protein, secreted placental alkaline phosphatase (SEAP), β-lactamase, galactosidase, firefly (Photinus pyralis) luciferase, blue fluorescent protein, yellow fluorescent protein, cyan fluorescent protein.
 - 19. The assay according to claim 18 wherein said reporter protein is luciferase which is detected in a microplate luminometer or using a CCD imaging system.

20. The assay according to any preceding claim wherein said reporter protein is used to localise and/or quantify the membrane receptor.

PCT

21. An assay according to any preceding claim wherein any change of said membrane receptor/reporter fusion protein is detected as a change in cellular localisation of the receptor/reporter fusion protein, or semi-quantitatively by the synthesis or degradation of said receptor/reporter fusion protein.

56

- 22. An assay according to any preceding claim wherein said detection of any change of said membrane receptor/reporter fusion protein is carried out with cells placed on the surface of a microscope slide or the like.
- 23. The assay according to any preceding claim wherein said detection of any change of said membrane receptor/reporter fusion protein is carried out on cells placed in a well of a microtitre plate or the like, such as a 96-well plate.
- 24. An assay for detecting a compound which has an effect on a membrane receptor, comprising the steps of
- a) expressing a membrane receptor/reporter fusion protein in a cell;
 - b) detecting a basal level of reporter activity;
 - c) adding a test compound to the cell; and
- d) detecting a resulting activity of the reporter protein, wherein alteration of reporter activity with respect to the basal level is due to the test compound having an effect on the membrane complex.



- 25. The assay according to claim 24 wherein the membrane receptor is a wild type receptor and alteration is a decrease in reporter activity.
- 26. The assay according to claim 24 wherein the membrane receptor is a constitutively active mutant receptor and alteration is an increase in reporter activity.
- 27. A membrane receptor/reporter fusion protein comprising a constitutively active mutant receptor which has a reporter added in-frame at the C-terminal.
- 28. The membrane receptor/reporter fusion protein according to claim 27 wherein the constitutively active mutant receptor is a GPCR.

29. The membrane receptor/reporter fusion protein according to either of claims 27 or 28 wherein the reporter protein is GFP or luciferase.

- 30. A compound identified by the assay according to any one of claims $1-26\sqrt{}$
- 31. Use of a compound identified by the assay according to any one of claims 1 26 in therapy.

add A'I